Student Name: _____

Missouri

Missouri Department of Elementary and Secondary Education

End-of-Course Assessment

Integrated Math III

Released 2009

RIVERSIDE
PUBLISHING
a subsidiary of Houghton Mifflin Harcourt

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Directions to the Student

Today you will be taking the Missouri Integrated Math III Test. This is a test of how well you understand the course level expectations for Integrated Math III.

There are several important things to remember:

1. Read each question carefully and think about the answer. Then choose the one answer that you think is best.
2. Make sure you completely fill in the bubble for the answer on your answer sheet with a number 2 pencil.
3. If you do not know the answer to a question, skip it and go on. You may return to it later if you have time.
4. If you finish the test early, you may check over your work.
5. Do NOT write any answers in your test booklet. Mark your answers directly on your answer sheet with a number 2 pencil.

1. **At a grocery store, Nancy makes a window display using cans of dog food. Her display is in the shape of a trapezoid that will be 8 rows high. The top row of Nancy's display has 6 cans, and each row below has one more can than the row above. How many total cans are in the display?**

A. 48

B. 51

C. 63

D. 76

2. **The objective of the game "Towers of Hanoi" is to transfer a tower of disks stacked in increasing size from one of 3 pegs to one of the other pegs. Only one disk can be moved at a time, and a larger disk cannot be moved onto a smaller one. The minimum number of moves required to move all the disks is shown in the table below.**

Number of Disks	Minimum Number of Moves to Complete Game
1	1
2	3
3	7
4	15
5	31
n	m

Which equation can be used to determine how many moves, m, are required for a stack of n disks?

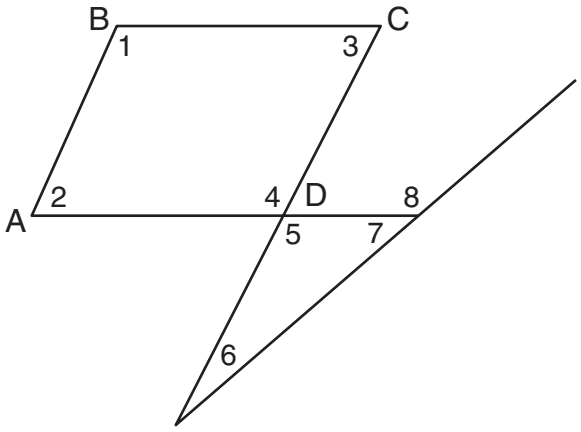
A. $m = 2^n + 1$

B. $m = 2^n - 1$

C. $m = 2^{n+1} - 1$

D. $m = 2^{n-1} + 1$

3. Figure ABCD is a rhombus.



If $m\angle 1 = 115°$ and $m\angle 6 = 40°$, what is $m\angle 8$?

A. 75°

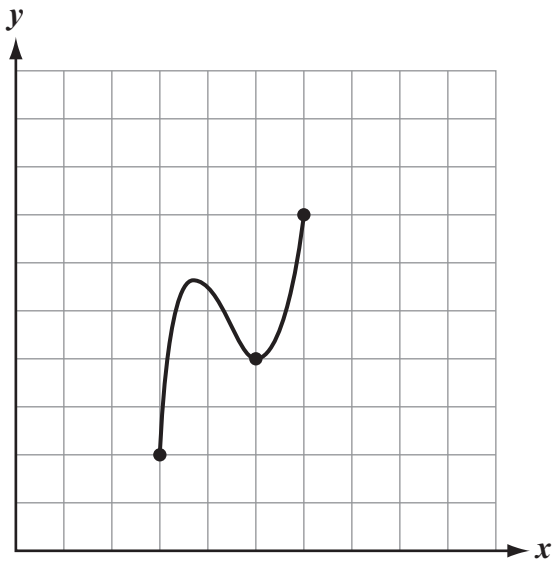
B. 105°

C. 115°

D. 155°

Go On ▶

4. Leeza noticed a snake slithering in the desert sand. It was shaped like the graph below.



The shape of the snake *most* resembles which type of function?

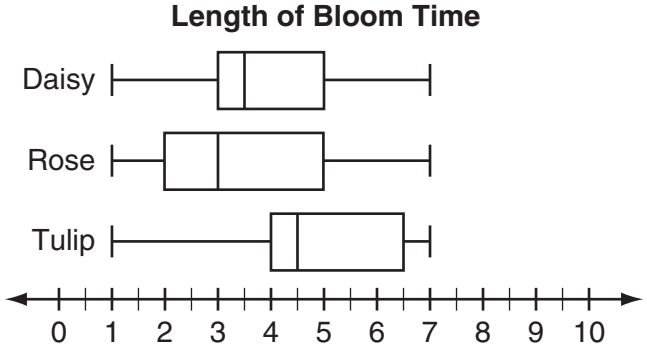
A. cubic

B. exponential

C. linear

D. quadratic

5. Ms. Chang wants a flower arrangement that will last at least 4 days.



According to the information shown in the box-and-whisker plot, what is the *best* kind of flower for her to buy?

A. daisy

B. rose

C. tulip

D. All three last 7 days, so it does not matter.

Go On ▶

6. **Which of these is the value of $\log_{0.5}32$?**

A. -5

B. 5

C. 16

D. 64

7. **How will the graph of the function $f(x) = 3^x$ translate when the function is changed to $f(x) = 3^{(x-2)}$?**

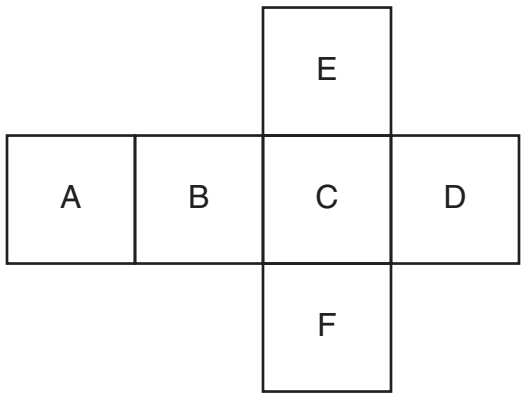
A. 2 units up

B. 2 units left

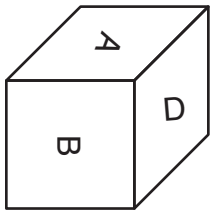
C. 2 units right

D. 2 units down

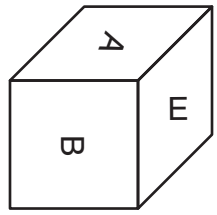
8. **Which cube is represented by this net?**



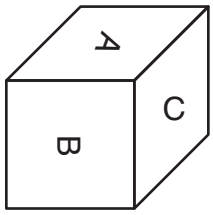
A.



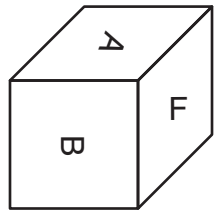
C.



B.



D.



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9. Which recursive rule would be applied to the sequence 2, 3, 4.5, 6.75, . . . ?

$a_n = n^{\text{th}}$ term
$a_1 =$ first term
$a_{n-1} =$ previous term

A. $\begin{cases} a_1 = 2 \\ a_n = (a_{n-1})^2 \end{cases}$

B. $\begin{cases} a_1 = 2 \\ a_n = 1.5a_{n-1} \end{cases}$

C. $\begin{cases} a_1 = 2 \\ a_n = 0.5a_{n-1} \end{cases}$

D. $\begin{cases} a_1 = 2 \\ a_n = 1.5a(n-1) \end{cases}$

10. Mr. Jenson gave his class the data below.

Input	–2	–1	0	1	4	5	7
Output	0.75	1.5	3	6	48	96	384

As part of the class warm-up, Mr. Jenson asked his students to describe the shape of the graph created by these data points. Which of these student responses *best* describes the shape of the graph?

A. cubic

B. exponential

C. linear

D. quadratic

11. What is the solution for this system of equations?

$$2x + 6y = 10$$
$$5x + 15y = 25$$

A. $(-1, 2)$

B. $(5, 0)$

C. no solution

D. all the points on the line

Go On ▶

12. **What is the solution to the equation?**

$$\log_2 8 + \log_2 32 = x$$

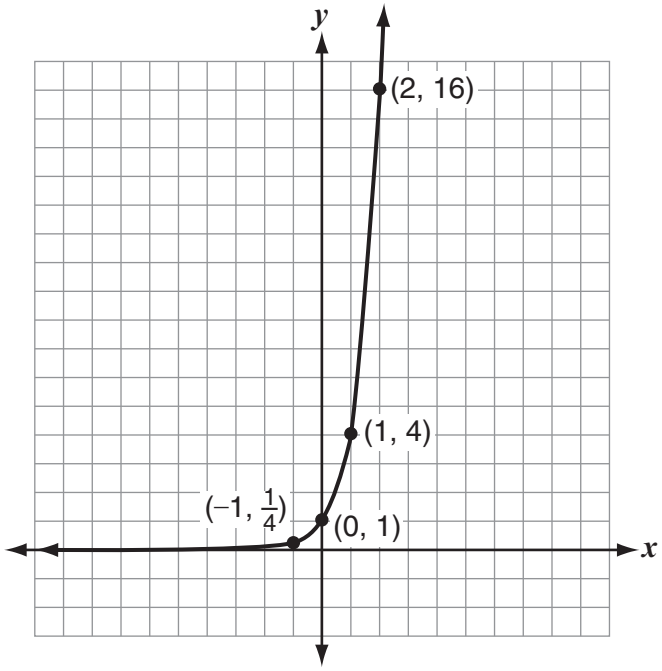
A. 4

B. 8

C. 40

D. 256

13. **The graph of a function is shown below.**



Which table represents the same function?

A.

x	y
−4	$\frac{1}{256}$
−3	$\frac{1}{64}$
−2	$\frac{1}{16}$

B.

x	y
−4	$\frac{1}{32}$
−3	$\frac{1}{16}$
−2	$\frac{1}{8}$

C.

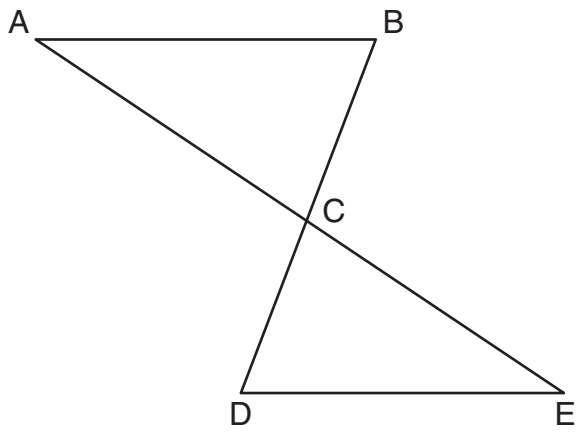
x	y
3	32
4	64
5	128

D.

x	y
3	64
4	256
5	512

Go On ▶

14. Which statement and reason complete the proof below?



Statements	Reasons
1) $\overline{AB} \parallel \overline{DE}$; C is midpoint of $\overline{AE}$	1) Given
2) $\overline{AC} \cong \overline{CE}$	2) Definition of a midpoint
3) $\angle BAC \cong \angle DEC$	3) If two parallel lines are cut by a transversal, then alternate interior angles are congruent.
4) $\angle ACB \cong \angle ECD$	4) Vertical Angle Theorem
5) _____	5) _____
6) $\overline{BC} \cong \overline{CD}$	6) Corresponding parts of congruent triangles are congruent.

A. $\Delta ABC \cong \Delta EDC$; SAS

B. $\Delta ABC \cong \Delta EDC$; ASA

C. C is the midpoint of $\overline{BD}$; definition of a midpoint

D. $\overline{AB} \cong \overline{ED}$; corresponding parts of congruent triangles are congruent

15. **Which shows all the vertical asymptotes of the function $f(x) = \frac{x + 4}{x - 4}$?**

A. $x = 4$

B. $x = -4$

C. $x = 0$ and $x = -4$

D. $x = 4$ and $x = -4$

16. **Henry has a bag containing 20 red marbles and 10 blue marbles. He takes out 3 marbles, 1 at a time, replacing each marble after he takes it out. What is the probability, to the nearest hundredth, that Henry took out 3 red marbles in a row?**

A. 0.25

B. 0.28

C. 0.30

D. 0.33

17. **Which list has the numbers in correct *ascending* order?**

A. $0, 3^{-1}, 3^0, 3^{\sqrt{3}}, \sqrt{3}$

B. $0, 3^{-1}, 3^0, \sqrt{3}, 3^{\sqrt{3}}$

C. $3^{-1}, 3^0, 0, 3^{\sqrt{3}}, \sqrt{3}$

D. $3^{-1}, 0, 3^0, \sqrt{3}, 3^{\sqrt{3}}$

Go On ▶

18. **What is the *y*-intercept of the equation $y = \log_5 x + 7$?**

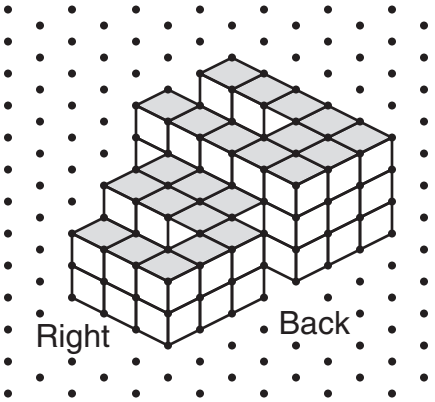
A. (0, 1)

B. (0, 5)

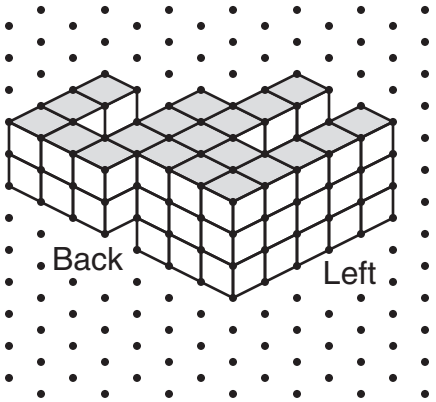
C. (0, 8)

D. There is not a *y*-intercept.

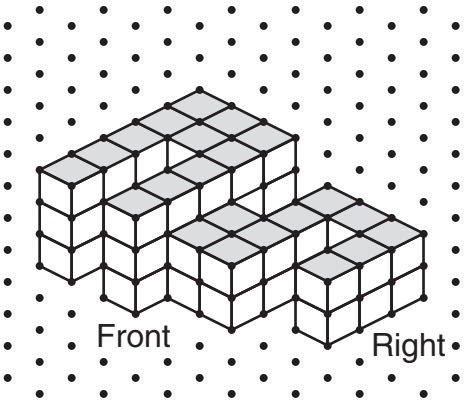
19. **Which of these representations is another view of the arrangement of blocks shown below?**



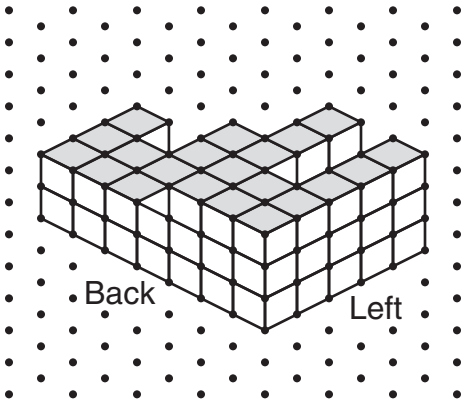
A.



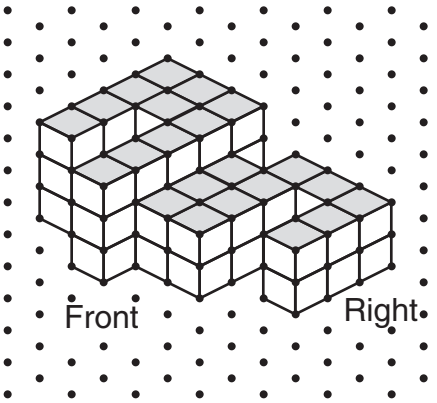
C.



B.



D.



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20. **Which value is equal to $0.\overline{8}$?**

A. -0.8

B. $\frac{4}{5}$

C. $\frac{8}{9}$

D. 0.89

21. **Clint, Scott, and Wayne went to the same store at different times to purchase shirts. There were 12 different styles of shirts available. They each picked a style at random. What is the probability they all bought the same style of shirt?**

A. $\frac{1}{4}$

B. $\frac{1}{36}$

C. $\frac{1}{144}$

D. $\frac{1}{1{,}728}$

22. **The Centers for Disease Control (CDC) discovered a new virus. The CDC discovered the rate of exposure increased by 5% a year. In a city in Belgium, 5,000 residents were exposed to the virus in 2007. At this rate, *about* how many residents will be exposed in 2015?**

A. 2,387

B. 5,250

C. 7,000

D. 7,387

23. **Mr. Jenkins graded a 23-point history quiz. His class had a mean score of 18 and a standard deviation of 2. He decided the quiz should have been worth 100 points. To fix the scores, he added 2 to every score and then multiplied by 4. What are the new mean and standard deviation?**

A. mean = 72; standard deviation = 8

B. mean = 80; standard deviation = 8

C. mean = 74; standard deviation = 10

D. mean = 80; standard deviation = 16

24. **Jed graphs $y = x^2$. Then he transforms this function on the same set of axes so that his newly graphed equation opens upward and has x-intercepts at (4, 0) and (−2, 0). Which equation could be Jed's transformed function?**

A. $f(x) = 4(x - 2)^2$

B. $f(x) = -2(x + 4)^2$

C. $f(x) = 4(x - 4)(x + 2)$

D. $f(x) = -2(x + 4)(x - 2)$

25. **Lisa has a container of dimes and quarters. In her container, she has 12 more dimes than quarters. If the total amount of money in Lisa's container is $11.35, how many quarters does she have?**

A. 24

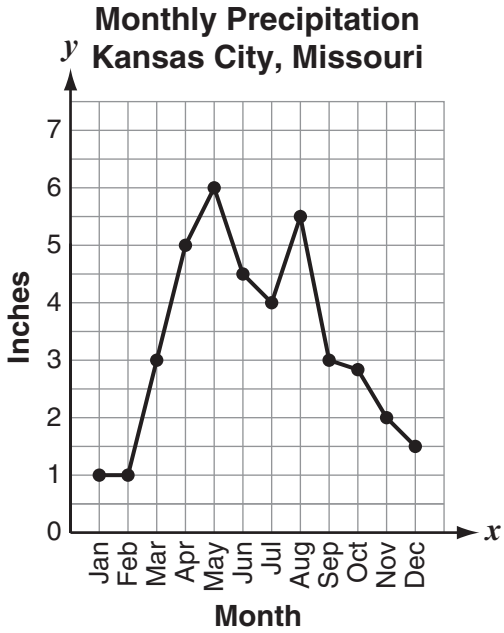
B. 29

C. 36

D. 41

Go On ▶

26. **The graph below shows the average inches of precipitation per month for Kansas City, Missouri.**



What is the approximate median monthly precipitation?

A. 3.0 inches

B. 3.3 inches

C. 3.5 inches

D. 4.5 inches

27. **Which expression is the simplified version of $\log x + \log y - k \log r$?**

A. $\log\left(\frac{xy}{r^k}\right)$

B. $\frac{\log(x + y)}{r^k}$

C. $\log(x + y - r^k)$

D. $\log(x + y) - k \log r$

28. **Which of these is the solution of $10^{3x+4} = 10^{5x^2-2}$?**

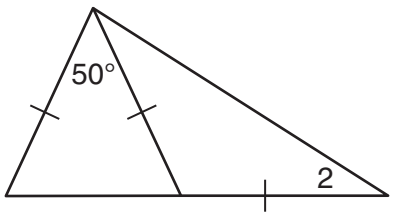
A. $\frac{-3 \pm \sqrt{111}}{10}$

B. $\frac{-3 \pm \sqrt{129}}{10}$

C. $\frac{3 \pm \sqrt{111}}{10}$

D. $\frac{3 \pm \sqrt{129}}{10}$

29. **What is $m\angle 2$?**



(Not drawn to scale)

A. 25°

B. 32.5°

C. 37.5°

D. 50°

30. **Which of these functions has the greatest *y*-intercept?**

A. $f(x) = 3(2)^x$

B. $f(x) = 5x + 2$

C. $f(x) = 4\cos x + 2$

D. $f(x) = 5x^2 + 3x + 4$

Go On ▶

31. **Maria has a savings account, where *b* represents the current balance. If the bank deposits 2% interest and then she withdraws $20, which expression represents the remaining money in her account?**

A. $0.02b - 20$

B. $1.02b - 20$

C. $0.02(b - 20)$

D. $1.02(b - 20)$

32. **How do the graphs of these equations differ?**

Equation I: $y = \log(x - 2) + 3$
Equation II: $y = \log(x + 2) + 3$

A. Graph II is 4 units above Graph I.

B. Graph II and Graph I are the same.

C. Graph II is 4 units to the left of Graph I.

D. Graph II increases at a faster rate than Graph I.

33. **Which function represents the graph having *x*-intercepts at -3 and 2 and passing through (3, 12)?**

A. $y = \frac{1}{2}(x + 3)(x - 2)$

B. $y = \frac{1}{2}(x - 3)(x + 2)$

C. $y = 2(x + 3)(x - 2)$

D. $y = 2(x - 3)(x + 2)$

34. **Which of these is the simplified form of $\frac{(x^3)^{-5}yz^{-6}}{xy^2}$ without negative exponents?**

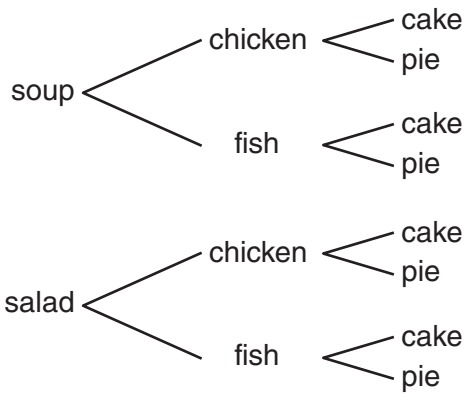
A. $\frac{1}{x^2yz^6}$

B. $\frac{1}{x^3yz^6}$

C. $\frac{1}{x^9yz^6}$

D. $\frac{1}{x^{16}yz^6}$

35. **Boxed lunches are prepared for a meeting. The tree diagram below shows each of the two choices for appetizer, entree, and dessert.**



There are equal numbers of each type of lunch. What is the probability that a randomly selected lunch has both fish and pie?

A. $\frac{1}{4}$

B. $\frac{3}{7}$

C. $\frac{1}{2}$

D. $\frac{3}{4}$

Go On ▶

36. **A certain car depreciates at a rate of 15% per year. If the purchase price of the car is $26,000, what will the value of the car be in 6 years?**

A. $3,900

B. $9,806

C. $22,100

D. $22,609

37. **Which of these lists of numbers is correctly ordered from *least* to *greatest*?**

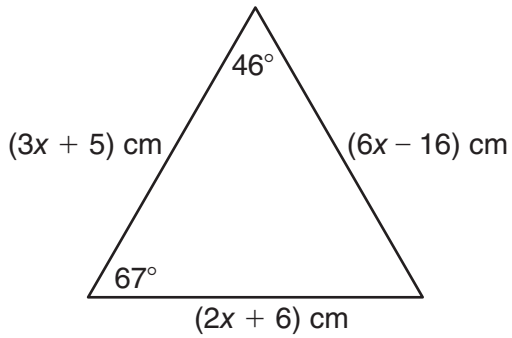
A. $\frac{9}{7}, \frac{9}{6}, \frac{9}{5}, \frac{9}{4}$

B. $\left(\frac{1}{2}\right)^{-1}, \sqrt{1}, \frac{5}{5}, 14^0$

C. $3.\overline{5}, 3.55, 3.50\overline{5}, 3.\overline{550}$

D. $-0.1, -0.11, -0.\overline{11}, -0.\overline{101}$

38. **What is the value of x?**



(Not drawn to scale)

A. 1

B. 7

C. 17

D. 26

39. **Given $f(x) = x^3 + x^2 - x$, what is $f(4)$?**

A. 16

B. 76

C. 256

D. 1,024

Go On ▶

40. **Milo is conducting a poll concerning people's favorite form of entertainment. Which location should he choose to obtain the *least* biased sample?**

A. a concert

B. a movie theater

C. a football game

D. a grocery store

STOP

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